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THE AGRICULTURAL COLLEGE AND ITS RELATIONSHIP TO THE SCHEME OF NATIONAL EDUCATION.*

BY

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Little more than *ex parte* statement can be expected from one whose thought and work have lain wholly on one side of a subject, and with such consciousness of lack of breadth I am impelled to explain that my subject is not of my choosing and if I should over-exalt the importance of the Agricultural College and its relationship to the scheme of National Education, may I escape censure because I neither offered to write nor chose the subject of the writing? I simply go to Nineveh and cry as commanded.

And yet all who observe, even but casually or remotely, the progress of the world's effort at institutional education are aware that the various forms of applied knowledge commonly termed "practical education" are over-whelmingly popular: that governments and individuals give most freely for their promotion: that pupils flock to their dispensaries: and that statesmen of all civilized and being-civilized countries invoke them and count the degree of their popular attainment the measure of future national achievement. Probably every nation in the world if called upon to propose a scheme of national education for a nation just about to be born would lay out a curriculum of bird songs and flowers, mud pies and hammer strokes, wheels and levers, lathes and looms, dynamos and dynamite, atmospheric nitrate making and advanced commercial methods which might obscure even the three R's of blessed memory. These older nations for themselves are curbed in their educational reforms by vested rights and ancestral beliefs and thus prevented from realizing popular ideals in education too rapidly, but one can easily see what revolutions might occur were these wholesome restraints removed.

With such a strong bent of the popular will toward the practical in education it is very clear that the next half century will see great changes in educational methods and materials, if not in the very ideals of education. It, therefore, becomes worth while to endeavor to descry the relationship of what we have to that which we may attain, and this will be the line along which I

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shall pursue the agricultural college and its relationship to the scheme of National Education.

In the first place I must ask that the term agricultural college be considered a synonym of agricultural instruction. Those institutions which have "agricultural college" as a distinctive name do not comprise or contain the agricultural instruction of the United States. There is only one pure College of Agriculture in the United States—that of Massachusetts. The reports of the United States Commissioner of Education endeavor to segregate and classify higher institutions into two categories: (*a*) "Universities, Colleges, and Technological Schools: (*b*) "agricultural and mechanical colleges," but it has to be stated that institutions of the land grant class are also included in the statistical tables of the former class, so that after all the grouping is not by institutions, but by subjects of instruction, so far, at least, as technological undertakings are concerned. The Commissioner's Report for 1905 enumerates the following:

Universities, Colleges, and Technical Schools	619
Schools of Technology	44
Agricultural and Mechanical Colleges	66

As already stated, these figures do not represent numerical segregation because the first group includes most of the second and third. They are not available for strict classification by subject either, because on this basis many more of the first group should reappear in the second or third groups: for example, Harvard University with its Bussey Institution and Yale University with its Sheffield School are both omitted from the agricultural group, to which they are conspicuously entitled to admission. Many other higher institutions should also be claimed as agricultural. In discussing statistics of this sort Dr. True and Mr. Crosby in their pamphlet on "The American System of Agricultural Education" fitly remark: "Owing to the complicated organization of many of the institutions having courses in agriculture * * * it is impracticable to show by statistics with exactness the means and facilities for strictly agricultural education. The general statistics of the land grant institutions may, however, serve to show with how great an enterprise, devoted chiefly to higher education along scientific lines and industrial lines, agriculture has been joined in permanent alliance and to indicate in some measure how extensive are the educational facilities at the command of the youth of the country who have sufficient intelligence, courage, and perseverance to follow out long and thorough courses of study in agriculture." The authors quoted evidently are apprehensive lest the statistics of the land grant colleges should include too much for agriculture. I believe that, though this may be true, they also exclude too much: but how excess and lack stand related I do not know.

It may be important, however to "show with how great an enterprise * * * agriculture has been joined in permanent alliance," by citing the progress in value of institutional property, income, teachers and pupils of the sixty-six agricultural and mechanical colleges.

Year	Valuation	Revenue	Instructors	Students
1895	$51,274,546	$5,178,580	1,539	25,723
1900	59,325,119	6,431,038	2,013	39,505
1905	81,251,764	11,767,154	2,672	53,518

Surely "enterprise" is just the word for an effort which more than doubles its income and its opportunities in a decade. It would be pleasant to undertake analysis of these figures and to determine the causes operating strongly in the previous decades, which forced this wonderful development of an educational idea just at the hinging of the two centuries in which we are permitted to live and act. The limitation of this paper, however, precludes reference to causes and agencies. Two claims of significance must be presented:

First: the gains in property and income of the Agricultural and Mechanical Colleges are far greater than their proportion of the gains of all institutions for higher education, *viz.:*

	1900	05
Total property valuation of 619 Universities and Colleges and Schools of Technology	$391,230,784	$514,840,412
Income of the same institutions	33,259,612	41,775,101
Total property valuation of 66 Agricultural and Mechanical Colleges	59,325,119	81,497,445
Income of the same institutions	6,431,038	11,659,955

By subtraction then (because the 619 institutions include the 66):

Total value of property of 553 institutions	$331,905,172	$433,342,967
Income of same institutions	26,828,574	30,115,146

Therefore, while 553 other institutions made a property gain in five years of $101,437,795, 66 agricultural colleges gained $22,172,326; or 11 per cent. of the institutions made 24 per cent. of the gain. In income the contrast is far more striking. The increase of income of the 553 institutions was $3,286,572, while the increase of income of the 66 was $5,264,917; or 11 per cent. of the institutions made about 61 per cent. of the total enhancement of revenue of the whole list of universities, colleges, and technological schools of the United States. This indicates most clearly the popularity of these institutions and as their support comes from governments and not from individuals, it argues generosity springing from popular appreciation and expectation which far surpasses private munificence.

Second: it is significant also that the revenue of our agricultural colleges is increasing at a more rapid rate than their property valuations. This is a working capital: something to work *with,* not to wait for. It is, of course, admitted that a vast endowment would be a surety of the future, and, therefore, earnestly to be desired, but the fact that such large sums of money are voted to be immediately used is really a very clear token of popular confidence and anticipation of immediate benefit. The actual endowment of these institutions is the wealth and outlook of the nation and of the states, than which there is nothing more productive and secure.

The second division of the subject assigned to me is the "relationship of the agricultural college to the scheme of national education." Here, too, I must ask to speak of the subject of agriculture rather than of the college of agriculture as an institution. Fifty years ago the need of such institutions and their prospective relationships were popular subjects of discussion. To-day we find them strongly established in every state and territory; generously supported, as figures already cited indicate; and doing such a commendable work in instruction and research that, in addition to other sources of increase, grants

from the general government for both lines of effort have practically doubled within the last twenty years. They are thus deeply and permanently planted in the scheme of national education of the United States, and I confess I cannot discuss their relationship to such a scheme as though they were apart from it or a thing still to be provided for it. The place of the higher institutions providing instruction in agriculture *within* the scheme of national education, and their duties and opportunities therein seem to me more fruitful subjects for contemplation.

It is, I believe, particularly fortunate that instruction in agriculture has developed almost entirely in institutions which were also devoted to the promotion of other branches of learning. The success of the Massachusetts Agricultural College, with a purely agricultural curriculum, cannot be cited as pointing in another direction, because in such a small commonwealth, so well provided with other outfits for higher education, it is in effect, though not in organic act, a department of agriculture. Such a result could not have been attained in a larger or a newer state without agencies for higher education. The association of agriculture with mechanic arts "without excluding other scientific and classical studies" in the original Morrill act of 1862 was so wise in its conception and grand in its results that it is hard to fully measure its influence, not only upon the general educational advancement of the country, but upon the recognition of agriculture as the greatest of applied sciences and a treasure-house of the best pedagogical materials. It seems to me unquestionable that the isolation of agriculture and mechanic arts from other studies, as might have been accomplished if the Morrill act had not ordered "liberal and practical education of the industrial classes," would have postponed indefinitely the intellectual and industrial advancement which the great central and western regions of the country have now attained. For the association of agriculture with broad culture has given us leaders and teachers of depth and grasp and its association with other technological studies and researches has produced experts and engineers for all the various undertakings which the development of agriculture on a great American scale required. The elevation of agriculture to its proper place in economics, and of the farmer himself to industrial self-consciousness, both of which advantages may now be claimed to have been fairly attained, are due to the scientific method and scientific achievements which have illumined and advanced policies and practices. Thousands of years of poetic and oratorical tributes to the nobility of agriculture accomplished less than a few decades of modern science and the wisdom of leading agriculture to the educational altar, where science awaited her approach, is grand to contemplate. "Wisdom is justified of her children."

And now agriculture has risen to a capacity for wider service, not only to herself but to humanity. In the scheme of enriched and widely distributed technical education which the present state of the world demands, agriculture holds the position of leadership, and all educational undertakings for advancement of manufactures, commerce, transportation, are largely related to it or conditioned upon it. This is true, first, because of the fundamental character of agriculture as a world supporting industry. Agriculture underlies all industries and draws upon all sciences. There is no work of man so deep and so broad. Agriculture leads all technical education in our national scheme be-

cause no other branch of it has such high value in its instructional outfit nor such breadth in its geographical distribution. It is true that the number of pupils is still incommensurate with the provision made for them, but, judging by recent increase, this will soon be changed.

It is fortunate for the advancement of technical education generally, which both public and private generosity join in promoting, that agriculture is the sort of applied science and comprehensive art that it is. Its very nature constitutes it the best foundation for such advancement and the one upon which it is easiest to build. Its relation to many sciences and its universality as a pursuit of men are phases of its suitability for the educational issue which is now arising. There is reason to believe that a third term will henceforward be employed in describing educational branches which are in good standing. First came "letters," and for centuries it practically covered educational effort. A few decades ago "science," after a long struggle, arose to honorable recognition as educational material, and the formula was "letters and science." The third term which must ere long be added is "industry" and "letters, science, and industry" will be recognized as equally capable of pursuit toward an equally satisfactory and honorable educational end. Industry as a pedagogical quantity must, of course, be used in accordance with sound pedagogic principles and for true educational ends, which may, however, require increasing in number because an industrial point of view and purpose must be included as worth knowing, not only for use but for culture. The changes in present educational philosophies and curricula to include the item "industry," and all that pertains to it in thought and action, will not prove so great and appalling as those which confronted "letters" when science claimed its seat. Nor is it apprehended that the actual teaching of "industry" will be any more crude or inadequate than were the beginnings of either letters or science. In fact enough has been done already to demonstrate that the elements of industry are as capable of presentation and demonstration to attain true ends of education as are the elementary facts and theories of letters or science, and because of our broader view of educational means and ends there is every reason to expect that the elements of industry will enter our lower schools and the inspiring researches and expositions of industrial materials, methods, relations, and point of view will occupy our higher institutions, in much less time and in a more satisfactory way than science has done, because the scientific method is now existent and forceful and will include all these quantities in its comprehensive grasp. When science began its educational career this method had to be developed and to win recognition.

Now if I may assume that this view is tenable, what are the duties of the agricultural colleges to the attainment of such ends? Several suggest themselves:

First: the agricultural college should demonstrate by living instances the value of an agricultural course for general educational ends. This can be done by good teaching, by effective research, by scholarly aspiration, and by breadth of view. It is important to show that a thorough agricultural course not only leads to vocational expertness and success, but is promotive of manhood and efficient citizenship. To this end the cultural elements as embodied in history, economics, languages, and literature should not be repressed or excluded. To be a man among men has never been sufficiently considered an agricultural

attribute, but in the future it cannot be disregarded. Whatever it may be deemed wise to do in improving and advancing our agricultural colleges in technical lines, or how much pre-professional work may be provided for in the four years' course, it will not do to pursue these plans too far. Requirement of post-graduate study for professional qualification is a much lighter burden upon a man than condemnation to narrowness and isolation. It is essential, therefore, to maintain a good amount of general culture work in the agricultural course, not only for the sake of those who follow it, but that it may exert an influence in favor of a greater amount of liberalization in other technical courses with which it may be associated. Such courses are now too narrow and their product not symmetrically developed. A graduate should not only be a technical expert but a "gentleman and scholar," manifesting such quality by daily walk and conversation and not by his "locked, lettered and braw, brass collar" furnished on commencement day. Robert Burns' standard was not written for men.

Second: the agricultural element in higher institutions must join with other elements of applied science in the earnest maintenance and promotion of the pure science elements. From such sources in the recent past have come to industry some of its most effective promoting forces. The very existence of an applied science is obviously conditioned upon the discovery of truth to apply. It would be destructive to undertake to lift a stream above its source. As agriculture is above all industries the one to which the greatest number of sciences make contribution, it should be the disposition of those who are now, by the Adams act, especially endowed for "original researches or experiments bearing directly on the agricultural industry" to appreciate the loftiness of science for its own sake and to win students to proper contemplation of its point of view. The term science is becoming so common that there is quite a danger of an inadequate conception of its character and function.

Third: the foregoing are incidental: the crowning duty and opportunity of the agricultural colleges at the present time are to demonstrate the educational value of the so-called agricultural studies and to prepare teachers to render that value available. Here again it is fortunate that agriculture touches so many branches of natural science, and so many arts, at so many points of contact: it is not only fortunate but this nature of agriculture, as already intimated, is its essential qualification for leadership in the wide acceptance of technical subjects in educational work of all altitudes which is evidently imminent and such leadership imposes heavy duties and responsibilities.

It is not necessary now to contend that elementary science has pedagogic value in the lower schools: that is universally conceded. It should not be necessary either to contend that elementary science instruction is rendered concrete, rational, and successful by employing it to arouse and strengthen powers of accurate observation and correct reasoning in the child mind, and that the scientific method is capable of reduction to such simple terms that a child can not only grasp its purpose, but is awakened and delighted with it. The duty of the agricultural college of each state to lead in the effort to render this branch of instruction spirited, correct in method and effective, and to displace as fast as possible perfunctory work and to exclude fadism, seems clear. To this end it should directly assist the normal schools by preparation of special teachers and otherwise promoting their undertakings in these lines and should coöperate with the educational departments of institutions with which it may

be a part to secure qualification of teachers for such work in primary and secondary schools. The assumption of a new line of work in this direction is provided for by the Nelson Amendment to the Agricultural Appropriation Act approved March 4, 1907, which provides that the agricultural colleges may use a portion of the additional money accruing to them by this act, "for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

The situation with the colleges of agriculture with reference to this undertaking is carefully set forth in an excellent article in the Experiment Station Record for February, 1907, from which the following summary statement is taken:

"A careful survey of the whole field reveals the fact that there is as yet no adequate provision for the preparation of teachers to take charge of agricultural courses in schools of agriculture, normal schools, or other secondary schools, nor is there any definite attention or encouragement given to the professional training of instructors for the agricultural work in agricultural colleges. The normal schools as at present organized cannot do this higher work, nor can it be done by the great universities unless they maintain colleges of agriculture.

The duty of training teachers of agriculture for both colleges and secondary schools will, therefore, under present conditions, fall upon the agricultural colleges, and the needs of the time are so great as to make this duty almost imperative. Some of the larger agricultural colleges, especially those which are departments of universities, might well provide facilities and encouragement for fundamental research in the science of education in its relation to agricultural subjects, and all should make provision for training teachers of agriculture."

Thus is outlined a service which the agricultural colleges can clearly render. As elementary industrial subjects are rising in educational recognition and service, an opportunity for the colleges of agriculture in universities to come into closer coöperative connection with the departments of education and of the natural sciences and of commerce in joint efforts for school enrichment and improvement, should be enthusiastically accepted. It will strengthen the position of the agricultural colleges within their immediate environment and increase their influence with the public at large.

The relationship, then, of the colleges of agriculture "to the national scheme of education" as my subject phrases it, is that of leadership in the most important work of rendering the curricula of the lower schools more rational; their materials better suited to their environment and more effective in helping the youth to find himself in life work and associations. These institutions more than any others, perhaps, are so placed that they can lay a firm hold upon science and higher branches of learning with one hand and upon the essentials of industrial efficiency and right living with the other. The association of these elements in individual character is the problem of the ages. It was descried by the ancients in the dawn of civilization; it will be solved in the millenium. Exceptional activity in the phase which it presents to this generation is certainly within the scope of the agricultural colleges.